Satellite Reconnaissance of the Future

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Yalu River separating China and North Korea.

The intelligence community is responding to a Presidential tasking that calls for more direct support of military operations. It is also adjusting to concepts presented in *Joint Vision 2010* that are based on the assumption that commanders will enjoy information superiority—an ability to see and hear virtually everything of importance—to control the course and outcome of any military operation. However, developing such a capability could take a decade or longer.

There may not be a consensus on the import of *JV 2010* for intelligence requirements that deal with targeting, damage assessment, and simultaneous operations until 2005. This would pose a serious dilemma. In 2005 it will be too late to change reconnaissance satellites in orbit to meet these requirements, and it will take several more

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years to develop and launch new satellite systems. Moreover, other nations will have increasing access to satellite-derived intelligence to support their operations while America's ability to use space to freely collect intelligence may be challenged.

Space is rapidly becoming commercialized. U.S. success during Desert Storm can largely be ascribed to superior information from its spaceborne intelligence system. Changes in the highly competitive field of space reflect this progress. Three American firms plan to launch commercial imagery systems before 2000, and at least ten nations will have imagery systems with resolution to one meter or less by 2010. That information will likely be available in the marketplace.

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Once others take advantage of space-borne intelligence technology, the reconnaissance gap with the United States will narrow, making covert military operations more difficult. There will be developments that thwart capabilities to see effectively from overhead systems. That interdiction could include attacks on U.S. satellite reconnaissance systems. Such threats are being scrutinized by the National Reconnaissance Office (NRO), which has the task of developing, launching, and operating imagery and signals intelligence satellites. Current systems must be replaced in the next decade. And although decisions on replacements are being made now, some questions remain unanswered.

As NRO develops the next generation of reconnaissance satellites, it is endeavoring to cope with the implications of change. Should satellites be built to support the policymaker or operator? What priority should be given to satellite system defense? What is the role of commercial remote sensing satellites? Who should be supported as budgets are cut? How will requirements change collection operations? The way in which NRO and the intelligence community at large respond to these questions will be critical to the joint warfighter. Decisions on collection systems can no longer be made without the direct participation of operators. Operations must be planned and directed according to formal doctrine—analogous to military doctrine—that provides general guidance.

New Doctrine

The Armed Forces have traditionally predicated doctrine on weight of effort. America out-produced and outfought its enemies in World War II. Consequently, measures of effectiveness in combat usually rested on attrition: body count, damage inflicted, and survivability rates. Damage assessment was therefore critical. But *JV 2010* is based on time, not attrition. Rapid and flexible maneuver, long-range weapons with high accuracy, and just-in-time logistics are possible with and dependent on accurate and timely information. Properly executed, *JV 2010* will force an enemy to adjust continually to agile operations that seize, maintain, and exploit the initiative. Its major tenets are:

- *dominant maneuver*—multidimensional application of information, mobility, and engagement capabilities to position and employ widely dispersed land, sea, air, and space forces to accomplish operational tasks
- *precision engagement*—the ability to detect and locate a target and, through responsive command and control, generate the desired effect, assess the outcome, and retain the flexibility to re-engage as required
- *full dimensional protection*—maintaining freedom of action during deployment, maneuver, and engagement whatever the threat
- *focused logistics*—fusing information, logistics, and transportation technologies to directly deliver tailored logistics packages and sustainment appropriate for specific operations.

The Joint Staff and services have yet to translate this vision into doctrine to guide planning and operations. They are, however, moving that way through games, model-based analyses, and field exercises. In July and August 1997, for example, the Navy used its major annual wargame, Global '97, to study specific ways that *JV 2010* would be applied to scenarios set in the future, not just for naval forces but for joint task forces operating in the Pacific and Southwest Asia.

JV 2010 assumes that superior information will not only be available but virtually perfect, in near-real time, and not interrupted in crises. A new vocabulary must be compiled to express this idea. For example, sensor-to-shooter implies that intelligence data will be fed directly to operators who pull triggers or fire missiles. Dominant battlespace awareness is the ability of commanders to see the big picture in sufficient detail to develop operational plans and make real-time tactical decisions. The revolution in military affairs refers to this new information-based warfare. Recently, the term net-centric warfare has been coined as an alternative to platform-centric warfare.

Underlying this vocabulary are assumptions about future operations. Among them is that virtually everything significant about the battlefield will be available to a force that fields a network of satellites and theater systems—ground- and sea-based as well as aircraft, including unmanned aerial vehicles (UAVs)—and that best exploits and disseminates information. All raw data will be fused and focused to provide a clear picture. Organizations will be flattened to create more direct connectivity among commanders and units. Individuals on much lower levels will make decisions. Communications systems will be able to carry such information. In the end, the tempo of war will be vastly increased, and only those who keep up with the rapid flow of information will succeed.

Moreover, if one can see everything in time to react, then there will be little need to plan. Others will not find this advantage to be destabilizing; consequently they will not interfere with the flow of perfect information to commanders. However such assumptions, imbedded in *JV 2010*, are untested. If these concepts are viable, measures will be needed to protect information systems, control the use of space, and deny an enemy access to vital information.

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Baghdad.

Intelligence and Doctrine

Both directly and indirectly through other members of the intelligence community, NRO is looking to the Armed Forces to determine what sort of information they need and how quickly. The National Security Agency (NSA), National Imagery and Mapping Agency (NIMA), Defense Intelligence Agency (DIA), Central Intelligence Agency (CIA), and various service activities form the intelligence community. But the services are unclear about how future doctrine will be applied

and are not prepared to describe the specific intelligence requirements to support it. Absent linkages to emerging doctrine, decisions about intelligence programs are likely to be based on traditional rather than emerging doctrine and current rather than future force structures and organizations.

One example of this disconnect can be found in the realm of analytical support and training, wherein the services are developing techniques to better educate commanders to apply intelligence capabilities against real world threats. At the behest of the Joint Requirements Oversight Council, which is chaired by the Vice Chairman, the services have combined to develop the joint simulation and modeling system (JSIMS) to imbed ISR into future exercise simulators. The goal is laudable but the process does not encompass how new types of operations will influence extant models of intelligence practices. Bureaucratic and procedural linkages of existing intelligence organizations and systems are basically being built into models to train future warfighters, not innovative ones needed for operations envisioned by *JV 2010*.

As a result decisions about future satellite design will likely be made primarily by technical experts instead of operators, reflect an understanding of early 1990s requirements vice emerging requirements, focus on the least costly rather than the most militarily effective means of supporting the requirements, and use inappropriate measures of effectiveness. While substantial performance improvements could still be achieved, one will nonetheless be denied support for the operations envisioned in *JV 2010*.

The debate between wide area and rapid revisit point coverage for imagery satellites may illuminate this point. Since Desert Storm, most attention has been focused on support of wide area coverage of the battlefield since it is relatively easy to describe what is needed from satellites by way of area coverage. Simply put, shoot a large area, then determine what's there by looking at the details. Much effort has gone into systems that provide this capability with a high degree of assurance. Certainly wide area coverage suffices for strategic purposes such as finding out who is building new military sites and equipment or for fixing the battlefield—that is, periodic snapshots to determine the location and movement of large formations. Rapid responsiveness is not critical in such cases. Using Desert Storm as the model, the demands of wide area coverage would dictate the best satellite architecture for the future.

JV 2010 suggests otherwise. Rapid maneuver and long-range precision ordnance presume access to precise, dynamic, highly responsive data: on-call, real-time, target-quality. In the realm of overhead reconnaissance, this means rapid revisit point coverage would be a priority: that is, the looking for specific targets and at designated locations. However, imagery satellites cannot stay in one place relative to the ground but rather are designed and programmed for a specific planned orbit. (Of course, satellites can be placed in geo-synchronous orbit far enough from earth—about 22,000 nautical miles out—where they essentially stay in the same place relative to a point on the ground. But while performing missions such as missile warning, communications, and weather reporting, they are too distant to obtain the resolution useful for military imagery.) What satellites will look for must thus be determined beforehand. They are launched into orbits that are difficult to change and must be told during each orbital pass both what to look for and where to aim.

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As a result the demand for responsiveness put on imagery satellite systems will be extreme. Moreover, timely response requirements must be met without compromising wide area coverage in support of the strategic warning needs of the National Command Authorities. Similar issues could be raised about signals intelligence satellites. Adapting the architecture for satellites and the C^{4}ISR system requires rethinking everything from system design to operational concepts.

While more time could be taken to consider these issues, things sometimes cannot wait in the evolution of military hardware. Each service copes with the problem differently. For example, the Navy typically builds multipurpose platforms along generic lines (aircraft carriers, destroyers, submarines) but changes its weapons as new technologies become available. The Air Force is more prone to leap from generation to generation based on new technologies such as stealth.

A third approach is to push leading edge technology and apply it in new ways. That means having the freedom, commitment, and will to take risks atypical in the budget process. In the past, for example, NRO encouraged and gambled on promising technologies. While some failed, others were very successful, which is partly why U.S. intelligence is far ahead of the rest of the world.

That such gambles could be taken at all was the result of a unique convergence of interests: public and specifically congressional acceptance that the Soviet threat was of such a magnitude that NRO programs would be judged primarily on performance and schedule, not cost. The services, on the other hand, have been subjected to much closer scrutiny and thus developed technology in accordance with the art of the politically possible, which lowered the risk and the planning horizon. However, weapon systems developed by the services are made far more powerful by virtue of the ISR advantages held by the United States.

Research and development is essential to maintaining a space advantage. It may not require the sort of breakthroughs possible during the Cold War, but continued technological innovation and evolutionary development are necessary to retain the information dominance on which *JV 2010* is based. But there will be false starts. Innovation rarely succeeds on the first try. The penalties for failure must be

minimized. We cannot afford to play it safe. In the end, innovation might best be pursued within a broad, qualitative understanding of future military requirements.

Determining Requirements

The task of determining operational intelligence requirements that are relevant to emerging doctrine should be guided by using past practice. The requirements for intelligence satellites have been typically developed by focusing on the threat or positing future scenarios, then asking CINCs and others to specify the amount and sort of coverage needed to support operations. Surveys were conducted of targets of interest to determine total volume and capacity performance, and then they were validated, filtered, and reviewed by the services and CINCs, and finally they were codified.

Fundamentally that is a reactive process. It was not designed or intended to account for whether forces would operate differently in ten to twenty years because there was no basic change in doctrine during the Cold War. In fact, until Desert Storm it was not clear how new technologies would influence operational art. Since then determining ISR requirements has been anticipatory. NRO began by examining future requirements in wargames, including those sponsored by the war colleges. In Global '96, sponsored by the Navy, several insights emerged pertaining to ISR.

- Military success depends on the fusion-analysis-dissemination loop, intelligence on new threats, near-continuous coverage of high interest targets, and adequate strategic warning.
- Devising measures of effectiveness to assess the importance of battlespace awareness for engagement outcomes is crucial for asset acquisition, deployment, and employment. One way to get ISR capabilities on annual CINC integrated priority lists (requirements for future warfighting capabilities) is to ensure ISR models are built into the front end of warfare assessment models.
- Streamlining the flow of intelligence from sensor systems to operators will require flatter command structures, more autonomy to forward-operating forces, and commensurate revisions in training, doctrine, and command.
- However effective collection against specific battlefield operations becomes, we must prepare the battlefield by learning about enemy intentions in addition to enumerating capabilities and selecting targets.

The "Army after Next" wargame played in January 1997 highlighted space protection issues for satellite reconnaissance. Once conflict seemed imminent to an enemy, there was a rush to war to disable space reconnaissance systems. Space attacks, with linkages to ground-based systems in supposedly secure sanctuaries, contributed to the escalation of conflict into home territories. Most of the players concluded that credible space doctrine and policy must be developed in order to deter attacks on future space assets across a range of threats.

Space Game One, played in June 1997 by U.S. Army Training and Doctrine Command, Army Space and Strategic Defense Command, and NRO, reinforced these conclusions by pointing up the need for more effective policy, strategy, doctrine, and tactics. The game suggested that:

- Future CINCs should synchronize space warfare operations with theater campaigns.
- Space is the high ground and operational success in theater depends on retaining space-based ISR, communications, and navigation capabilities; the protection of these systems must be considered in developing deployment packages.
- Space-based threats may be virtually impossible to defeat unless protection schemes are factored into spacecraft designs and reconnaissance architectures.

Requirements for future reconnaissance satellite systems were explored in Forward Focus, a series of games conducted by NRO and the Office of the Secretary of Defense. The object was to determine the types of knowledge required by policymakers and operators in a conflict and crisis. Conclusions from the first three games recommended more agile, focused intelligence on specific events or activities, which contravened the conventional wisdom that the primary need is wide area coverage to fix the battlefield each day. More specifically, the games pointed out that:

- The time available to plan (between request and action) was the most critical variable in determining the sort of intelligence needed.
- Wide area coverage alone was not sufficient for operations envisioned by *JV 2010*.
- In ambiguous planning situations, the demand increases for in-depth, higher-quality knowledge of more complex objectives as well as target sets.

Operators placed a greater value on responsiveness to tasking against a relatively small and discrete set of targets than detailed information requiring more time to deliver. From these findings it might be assumed that merely detecting an event or target and recognizing a few characteristics is sufficient and that *JV 2010* does not require understanding enemy intentions and plans. However, when presented with preconflict crisis avoidance and contingency planning situations the results of the games were different. Players thought it more important to understand an enemy than react to its initiatives. From their perspective, it was important to take the time to know what is happening in detail and assess possible outcomes in order to develop a full range of options.

Disconnects

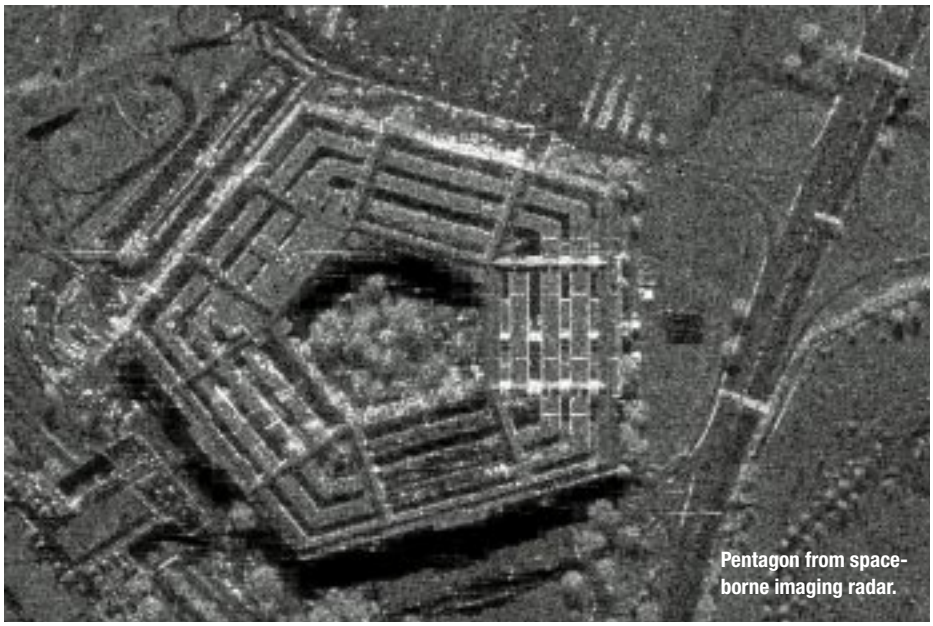
Even after gaming and analysis the military has not incorporated the conceptual framework found in *JV 2010* into doctrine for intelligence requirements, which makes it difficult to translate the vision into reality. One real concern about moving too quickly to optimize satellite and airborne collection is that the most important type of support ISR systems provide to the military may no longer be orders of battle and intelligence preparation of the battlefield. Instead, specific highly-focused intelligence on the movements of terrorists, weapons of mass destruction, or illegal drugs are key features of the post-Cold War security environment. Systems optimized for support of the conventional battlefield may not be suited to provide specific data on individuals or fixed points.

In addition, while the intelligence community will assign a priority to

military support, it is clear that the Armed Forces will not be the exclusive users of data gleaned from national sensors. The primary customer for NRO material is, and will remain, the National Command Authorities.

Whereas operational data such as the location of combat units, movements, and emissions implying an imminent attack are key to commanders in the field, NCA is more interested in longer-term strategic warning. Which countries are threats, what are their intentions, and what capabilities are being developed? Longer lead time, more focus on intentions than immediate capabilities, and a different way of putting the picture together are required.

The number of customers interested in overhead imagery is growing. In addition, national satellite reconnaissance is likely to attract more interest in the future. Through civilian authorities, NRO systems help assess domestic emergencies such as the earthquake in Northridge, California, and Hurricane Andrew. During a recent interactive exercise conducted by the Federal Emergency Management Agency that posited a catastrophic earthquake along the New Madrid Fault underlying the Mississippi River, NRO was an initial source of information for the participants. Such cases would indicate that national sensor systems should not be designed solely for military operations. Some alternative to direct control of national assets by the services will be required.



Pentagon from space-borne imaging radar.

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Finally, current force planning discourages transitioning to dependence on national systems, which runs counter to concepts found in *JV 2010*. Explanations include service parochialism, reluctance to depend on assets that the services do not control, and inherent doubts about *JV 2010* itself. The Army, for example, envisions ground combat under conditions of radically increased lethality and mobility, true battlespace transparency, and a global information environment. But in terms of formal doctrine the Army still believes that tasking authority for satellite systems will not intermesh with corps or division operations because access to targets cannot be assured or will not be timely, and thus the results of tasking will be opaque to requesting commanders. In the words of one Army commander, "I would be begging for coverage, and that is not acceptable."

The Navy and Air Force have similar concerns. The Navy white paper supporting *JV 2010* states that naval (as opposed to national) intelligence, surveillance, and reconnaissance will be the basis for information dominance. A change in the current concept—that tasking national technical means is reserved to the fleet commander in chief instead of the operational level—is not apparent. For the Air Force, decisionmakers (regardless of rank or position) will have full tasking authority over national assets. But it is unclear how specific tasking of national sensors will occur or who will do it. Issues of knowledge, training, authority, and trade-offs lie buried in the details.

Turning a vision into reality is not a technical issue. National collection systems—satellite and airborne—can be designed to do virtually anything. The disparities are cultural and doctrinal. Despite a decade of effective joint operations, the services tend to develop capabilities and doctrine independently. Although visionaries dream of global brains, systems of systems, seamless C^{4}ISR networks, and inherently cooperative joint task forces, the reality on the operational, and more to the point, programmatic level is that the services remain highly parochial, mutually distrustful, and fiercely competitive for decreasing slices of the defense budget.

The prevailing attitude appears to be "If I don't own it I can't count on it." UAVs are a case in point. The services independently develop them to provide ISR support despite their high cost. Some claim that the services distrust each other or the national overhead sensor systems to meet their needs on the operational level. In fact, however, the issue should not be framed as satellites or UAVs, but rather in terms of designing and operating ISR systems to work together effectively. Toward that end, a joint rather than an individual service view would be more efficient.

Another factor inhibiting the services from embracing *JV 2010* is that many senior officers are skeptical

about concepts like the system of systems or unclear about the meaning of dominant battlespace awareness and its application to operational planning. Here the intelligence community must do more than promise; it must demonstrate its ability to deliver. And, to some extent, it must be willing to relinquish direct operational control of national satellite and airborne systems in both exercises and operational support before the military will integrate them into their planning.

Despite these issues, the concepts presented in *JV 2010* will eventually become reality; but incremental thinking and evolutionary development probably will not achieve this end.

Future ISR Systems

Once decisions on the next generation of national overhead systems are made, it may be too late to weigh military requirements. So to the extent that the services are serious about support for future operations NRO and its national intelligence partners must get together with the services and CINCs. The task must be to translate visionary concepts into specific operational requirements to include selecting criteria for the next generation of satellites.

There are two major views of how future generations of national satellite systems should be designed. One is the same but better: wide area coverage, support for national strategic warning, and perhaps marginally more coverage by changing the mix of collectors. Commercial systems are one way to provide broad area coverage for operations, at least insofar as service needs are realized. The other is what *JV 2010*, the services, and advocates of the future battlefield envision: a fused, integrated, joint, and responsive intelligence picture that directly supports the joint warfighter.

NRO must determine how to provide operational control of collection systems in specific ways to commanders. Various approaches could be tested using games and exercises, with time (or some other way of defining a percentage of the potential intelligence "take") reserved for them in real world priority allocations. Other agencies already share collection time among customers, including commanders, on a direct allocation basis. To achieve this end satellite operating doctrine must be changed since allocations are now generally made daily in response to specific taskings.

Unfortunately, commanders may not be content with sharing and might not even exercise capabilities that they are not certain would be available in wartime. One lesson of Desert Storm is that combat units are most comfortable and practiced at integrating weapons with intelligence and targeting sensors that are organic. Rather than depend on national intelligence, commanders have instinctively preferred to control ISR assets and are likely to favor building indigenous systems such as UAVs until a process can be developed to ensure the reliability of national systems. This is a major cultural change that can only be brought about from within the intelligence community, and NRO must foster the requisite trust to change this deep-seated military instinct. A number of implications would stem from such a plan.

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CINCs—and perhaps joint task force commanders—must understand far more about system capabilities, about what is possible and what is not, and about assigning tasks to get the questions answered. Staffs would have to do the tasking. What do they need to know to fulfill their role? What are the implications of turning control of national systems over to CINCs and JTF commanders (that is, where is the line drawn since more than data is involved)?

Moreover, ISR from sensors other than satellites, such as nationally-owned air-breathing platforms, would have to be fused with satellite data and with indigenously-collected data and the overall picture made user-friendly to commanders. For example, missile warning satellite data that is generated by the commander in chief of U.S. Space Command, signals intelligence collected by NSA, and information from service capabilities (such as the Navy integrated undersea surveillance system) should also be fused at the national or operational level to form a single picture.

To do that, NRO, NSA, NIMA, and the services must work together outside of their own collection disciplines to anticipate future requirements for operating forces in order that the requisite systems can be designed, integrated, and fielded before they are actually needed. This is difficult and may demand that entire operational patterns and institutional self-images be changed.

Space Defense

The basic importance of data derived from space for future operational success means that our ability to operate in space is increasingly likely to be placed at risk by an adversary. This has significant implications for the design of space architectures and associated concepts of operation. Doubters need only recall that during World War I newly-developed airplanes were seen merely as reconnaissance platforms—until the protagonists started wondering why they should be openly exposed to enemy intelligence collection and began to shoot at each other's airplanes. The result was ground anti-air warfare, then air-to-ground and air-to-air warfare, and finally control of the air as a requisite for success in operations on land or at sea. Many project it will be so with space.

Acceptance of space as a theater of war will require a shift in thinking just as significant as that of the 1950s when the superpowers built up nuclear arsenals. Herman Kahn, Bernard Brodie, Henry Kissinger, and others conceived the theory of nuclear deterrence that led to policy options, strategic plans, military doctrine, operational choices, and the notion of strategic stability. Risks in space must be conceptualized from a similar perspective to avoid a destabilizing situation whereby a disadvantaged party denies the use of space, or at least space-derived data, to the United States.

The Armed Forces must include enemy measures as well as their own countermeasures in the design, construction, and operation of future satellite systems. While active defense of NRO assets will necessarily be carried out by the military, NRO (and designers of commercial satellites) could help by designing self-defense measures into satellite architectures.

This is akin to protecting sea lines of communication against submarines, in which overall utility is measured by throughput aboard convoyed merchant ships, not by the number of escorts or submarines sunk. Mutual planning and coordination on the expected threat, convoy tactics, and countermeasures taken in various contingencies will help shipbuilders and the Navy prepare more effectively. Similarly, success in space control operations will not be measured by the number of enemy antisatellite systems destroyed, but the ability to operate utilizing ISR collected from space. U.S. Space Command could perform a function in space analogous to that of the Navy on the high seas. As *Space Vision 2020* indicates, "it would merely be stating an operational reality to think of space as an [area of responsibility]" in the same way as the Pacific, Atlantic, or European regions.

NRO can improve its dependability by including the requirement to enhance space control in assessments of satellite architecture. For example, it could achieve defense in depth by building critical satellite systems that operate beyond the range of ground-based anti-satellite systems. Or it could emphasize rapid regeneration (ready-launch) in design criteria. Other options could also be explored. This is not the task of NRO alone since it also affects commercial satellites on which the Nation depends. Nor is the consideration of hard-kill countermeasures an exclusive domain of the military. An overall strategy is required, complete with supporting deterrence policy.

Taking such considerations into account about space warfare would signal a marked change to the business-as-usual approach of making feasible technological improvement on the margins of existing technology. It would entail bounding the problem, examining the protection mission, and framing the answers. And it would require focused thinking, not impromptu judgments formed in the heat of a wargame or during a crisis. NRO and the intelligence community must concentrate on common interests and create partnerships with U.S. Space Command in the area of planning, with U.S. Atlantic Command in doctrine and exercises, with the services in developing doctrine, and with the Joint Staff in coordinating systems development for anticipated space operations.

Institutionalizing ISR

Though desirable in the abstract, the integration of *JV 2010*, emerging service capabilities, and new ISR capabilities will require a number of pragmatic steps before becoming reality.

- Consideration should be given to establishing an institution to anticipate intelligence uses. It might operate along the lines of U.S. Army Training and Doctrine Command (perhaps as part of the National Defense University) and create strategies on the operational uses of intelligence, chart doctrinal requirements for ISR and translate them into system requirements, assess offensive strike versus force defensive needs, improve understanding of the role of ISR in campaign analysis, and engage in dialogue on linking space warfare and national sensor systems.
- General and flag officers should receive an expanded module on the operational dimensions of ISR in military planning and operations in the Capstone and Joint Flag Officer Warfare courses.
- Wargaming and models should be used extensively on various levels not only to explore the importance of space-derived intelligence data but means of ensuring its collection and delivery. Specifically, Forward Focus should continue and its results should be widely disseminated. Future games should examine relationships between intelligence collection systems and the need to defend them, as well as planning by others to develop ISR that both uses space and denies space-derived intelligence to the Nation. NRO should participate in major service wargames.
- NRO should engage the intelligence community, CINCs, and services in a discussion on passing direct operational control of national reconnaissance assets to commanders. Clear lines of responsibility would be required that may lead to creating a position to manage and operate satellite reconnaissance systems and other platforms to support crises or military operations.
- NRO should encourage and engage in a national dialogue about the implications of space as a future battlefield.
- Models should be developed, perhaps under NRO, to evaluate those operational concepts emphasizing simulations which more accurately depict future operations dependent on information superiority rather than constructing detailed models based on old ways of doing business (such as JSIMS). Measures of effectiveness for evaluating information and time must be incorporated into assessment models. Indeed, measures such as the number of things destroyed will be irrelevant if the objective of using force is a lockout (precluding reasonable options to an enemy except preemptive surrender or backing away before a crisis becomes overt conflict).

Traditional means of collecting and using intelligence may survive. But the day when multiple intelligence agencies, operating autonomously behind a veil of secrecy and classified budgets, could deploy the latest and greatest technology without any fiscal constraints has waned. A new era in national security planning, centered around information superiority, has arrived. **JFQ**